

Infection Prevention & Control Measures for Ebola Virus Disease (EVD)



الإدارة العامة لمكافحة عدوى المنشآت الصحية

General Directorate of Infection Prevention and Control in Healthcare Facilities



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Topics

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What is Ebola Virus Disease?

- Ebola virus was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of Congo. Since then, the virus has been infecting people from time to time, leading to **outbreaks** in several African countries.
- Ebola virus disease (EVD) is a deadly disease with occasional outbreaks that occur mostly on the African continent.



EVD most commonly affects people and nonhuman primates (such as monkeys, gorillas, and chimpanzees). It is caused by an infection with a group of viruses within the genus *Ebolavirus*:

- Ebola virus (species *Zaire ebolavirus*)
- Sudan virus (species *Sudan ebolavirus*)
- Taï Forest virus (species *Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*)
- Bundibugyo virus (species *Bundibugyo ebolavirus*)
- Reston virus (species *Reston ebolavirus*)
- Bombali virus (species *Bombali ebolavirus*)



Of these, only four (Ebola, Sudan, Taï Forest, and Bundibugyo viruses) have caused disease in people.

Reston virus can cause disease in nonhuman primates and pigs, but there have not been cases in people.

Bombali virus was first identified in bats in 2018, and experts do not know yet if it causes disease in either animals or people.

Mode of Transmission

- The virus first spreads to people through direct contact with the blood, body fluids and tissues of animals. Ebola virus then spreads to other people through direct contact with body fluids of a person who is sick with or has died from EVD. This can occur when a person touches these infected body fluids or objects that are contaminated with them. The virus then gets into the body through broken skin or mucous membranes in the eyes, nose, or mouth. People can get the virus through sexual contact with someone who is sick with or has recovered from EVD. The virus can persist in certain body fluids, like semen, after recovery from the illness.

A person can only spread Ebola to other people after they develop signs and symptoms of Ebola.

Risk

- Health workers who do not use proper infection control while caring for Ebola patients, and family and friends in close contact with Ebola patients, are at the highest risk of getting sick. Ebola can spread when people come into contact with infected blood or body fluids.
- Ebola poses little risk to travelers or the general public who have not cared for or been in close contact (within 3 feet or 1 meter) with someone sick with Ebola.

Mode of Transmission

- Airborne transmission of Ebola has not been documented in hospitals or households during any of the human outbreaks investigated to date
- certain procedures (e.g., bronchoscopy, endotracheal intubation) might create mechanically generated aerosols that could be infectious

Mode of Transmission

- aerosol-generating procedures require additional precautions.
- **CDC** recommends that all healthcare workers entering the room of a patient with Ebola wear respiratory protection that would protect them during an aerosol-generating procedure.

Signs and Symptoms

- Symptoms may appear anywhere from **(2 to 21)** days after contact with the virus, with an average of (8 to 10 days).
- signs and symptoms of Ebola often include some or several of the following:
 - ✓ Fever
 - ✓ Aches and pains, such as severe headache and muscle and joint pain

Signs and Symptoms

- ✓ Weakness and fatigue
- ✓ Sore throat
- ✓ Loss of appetite
- ✓ Gastrointestinal symptoms including abdominal pain, diarrhea, and vomiting
- ✓ Unexplained hemorrhaging, bleeding or bruising
- ✓ Other symptoms may include red eyes, skin rash, and hiccups (late-stage).

Signs and Symptoms

- the course of the illness typically progresses from
 - ✓ dry” symptoms initially (*such as fever, aches and pains, and fatigue*),
 - ✓ and then progresses to “wet” symptoms (*such as diarrhea and vomiting*) as the person becomes sicker.

Ebola Vaccine

- The U.S. Food and Drug Administration (FDA) approved the Ebola vaccine rVSV-ZEBOV (called Ervebo®) on **December 19, 2019**. This is the first FDA-approved vaccine for Ebola.
- This vaccine is given as a single dose vaccine and has been found to be safe and protective against Zaire ebolavirus,



Ebola Vaccine

- On February 26, 2020, the Advisory Committee on Immunization Practices (ACIP) recommended pre-exposure prophylaxis vaccination with rVSV-ZEBOV for **adults ≥ 18** years of age in the U.S.
- population who are at risk of exposure to Zaire ebolavirus. This recommendation includes adults who are:



Ebola Vaccine

- ✓ Responding or planning to respond to an outbreak of EVD;
- ✓ Laboratorians or other staff working at biosafety-level 4 facilities that work with live Ebola virus in the United States; or
- ✓ Healthcare personnel working at designated Ebola Treatment Centers



Case Definition

1- Suspected Case:

- ❑ Illness in a person who has both consistent symptoms and risk factors
 - Clinical criteria, which includes **fever of greater than 38.6°C**, and additional symptoms such as:
 - ✓ *severe headache*
 - ✓ *muscle pain*
 - ✓ *vomiting*
 - ✓ *diarrhea*

Case Definition

- ✓ abdominal pain
- ✓ unexplained hemorrhage (gingival, nasal, cutaneous, gastrointestinal, rectal, urinary)

AND

- Epidemiologic risk factors within 21 days before the onset of symptoms:
- ✓ contact with blood or other body fluids of a patient known to have or suspected to have EVD

Case Definition

- ✓ Residence in or travel to an area where EVD transmission is active
- ✓ Direct handling of dead or alive fruit bats, monkeys, chimpanzees, gorillas

Case Definition

2- Confirmed Case:

- A suspected case with laboratory-confirmed diagnostic evidence of Ebola virus infection

Isolation Precautions

- Contact and droplet precautions in addition to standard precautions for stable
- Additional precautions should be taken during aerosols generating procedures.

Patient Placement

- Place the patient in **single isolation rooms** with toilet and handwashing sink
- Isolation units should maintain **a log** of all persons entering the patient's room
- Restrict entry to only those considered essential
- Do not interchange staff in this area with other areas in the hospital

Personal Protective Equipment (PPE)

Selection of recommended PPE for healthcare workers in close contact with patients will depend on clinical assessment of the patient (CDC)

Personal Protective Equipment (PPE)

Depend on the patient clinical situation:

- A. Patients who have suspected or confirmed Ebola who are **clinically stable and does not have bleeding, vomiting, or diarrhea**
- B. Patients who have suspected or Confirmed Ebola who are **Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea**

Personal Protective Equipment (PPE)

Patients who have suspected or confirmed Ebola who are clinically **stable and does not have bleeding, vomiting, or diarrhea**

Personal Protective Equipment (PPE)

- a. Single-use (disposable) fluid-resistant gown that extends to at least mid-calf or single-use (disposable) fluid-resistant coveralls without integrated hood
- b. Single-use (disposable) full-face shield
- c. Single-use (disposable) facemask
- d. Single-use (disposable) gloves with extended cuffs. (Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.)



Personal Protective Equipment (PPE)

Steps of Donning PPE:

1. Remove Personal Clothing and Items
2. Inspect PPE Before Donning
3. Perform Hand Hygiene
4. Put on Inner Gloves
5. Put on Gown or Coverall
6. Put on Facemask
7. Put on Outer Gloves
8. Put on Face Shield over the surgical facemask
9. Verify

Personal Protective Equipment (PPE)

Steps of Doffing PPE:

1. Inspect the PPE Before Doffing
2. Disinfect and Remove Outer Gloves
3. Inspect and Disinfect Inner Gloves
4. Remove Face Shield
5. Disinfect Inner Gloves
6. Remove Gown or Coverall

Personal Protective Equipment (PPE)

Steps of Doffing PPE:

7. Disinfect and Change Inner Gloves
8. Remove Surgical Facemask
9. Disinfect and Remove Inner Gloves
10. Perform Hand Hygiene
11. Inspect

Personal Protective Equipment (PPE)

Patients who have suspected or Confirmed Ebola who are Clinically **Unstable or Have Bleeding, Vomiting, or Diarrhea**

Personal Protective Equipment (PPE)

Training on Correct Use of PPE:

1. There should be training for the **HCW** about the donning and doffing PPE before caring for a patient with Ebola
2. **HCW** required to demonstrate competency in using PPE, while being observed by a trained observer, before working with patients with Ebola.
3. **HCW** unwilling or unable to fulfill these requirements should not care for a patient with Ebola.

Personal Protective Equipment (PPE)

Use of a Trained Observer:

1. The trained observer must be knowledgeable about all PPE recommended and the correct donning and doffing procedures
2. trained observer should read aloud to the healthcare worker each step **in the procedure checklist** and visually confirm and document that the step has been completed correctly.
3. **HCW** unwilling or unable to fulfill these requirements should not care for a patient with Ebola.

Personal Protective Equipment (PPE)

1. Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf, **OR** Coverall without integrated hood
2. PAPR (Powered Air-Purifying Respirator) **OR** Single-use N95 respirator with *single-use (disposable) surgical hood extending to the shoulders and single-use (disposable) full-face shield.*
3. Single-use (disposable) examination gloves with extended cuffs.
4. Single-use (Disposable) boot covers (*waterproof and go to at least mid-calf or leg covers*)



Personal Protective Equipment (PPE)

5. Single-use (disposable) fluid-resistant gown that extends to at least mid-calf, **OR** Coverall without integrated hood
6. PAPR (Powered Air-Purifying Respirator) **OR** Single-use N95 respirator with *single-use (disposable) surgical hood extending to the shoulders and single-use (disposable) full-face shield.*
7. Single-use (disposable) examination gloves with extended cuffs.(2)



Personal Protective Equipment (PPE)

8. Single-use (Disposable) boot covers *(waterproof and go to at least mid-calf or leg covers)*

Depend on the type of coverall:

- **coverall without integrated socks**
 - ✓ Should be used *(the upper band of the boot cover will be worn UNDER the pants leg of the coverall)*

- **coverall with integrated socks**
 - ✓ No need to use it *(can be omitted)*



Personal Protective Equipment (PPE)

Sequence for Donning and doffing PPE according :

Pleas read

- ✓ <https://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html>

Personal Protective Equipment (PPE)

Watch CDC video:

How to Safely Put on PPE, Selected Equipment: N95 and Gown(video):

✓ <https://youtu.be/Ca66dpjPWZc>

How to Safely Take off PPE, Selected Equipment: N95 and Gown

✓ <https://www.youtube.com/watch?v=bZA424c5sWQ>

Patient Care Equipment

- Dedicated medical equipment (preferably disposable, when possible) should be used for each patient.
- if can not be detected for patient ,it should be cleaned and disinfected between patients according to the manufacturer's instructions and MOH guidelines.

Aerosol Generating Procedures (AGP)

- CDC recommends that all healthcare workers entering the room of a patient with Ebola wear respiratory protection that would protect them during an aerosol-generating procedure.
- Avoid AGPs for EVD patients as possible as you can

Aerosol Generating Procedures (AGP)

Additional precautions when performing aerosol-generating procedures:

- ✓ Wear Fitted - N95 mask or PAPR
- ✓ Wear eye protection
- ✓ Wear a clean, non-sterile, long-sleeved waterproof gown
- ✓ Perform procedures in a negative pressure room. (If not available, conduct the procedure in a private room with portable HEPA filter)
- ✓ Limit the number of persons present in the room
- ✓ Perform hand hygiene before and after contact with the patient and his or her surroundings and after PPE removal.
- ✓ Conduct environmental surface cleaning following procedures

Environmental Infection Control and Waste Management

- HCWs performing environmental cleaning and disinfection should wear recommended PPE (**described above**) and consider the use of additional barriers (shoe and leg coverings, etc.) if needed.
- face shield or facemask with goggles should be worn when performing tasks such as liquid waste disposal that can generate splashes.
- Environmental surfaces and equipment should be disinfected by using approved **intermediate-level disinfectants**.

Environmental Infection Control and Waste Management

- Routine cleaning of the PPE doffing area should be performed at least once per day and after the doffing of grossly contaminated PPE.
- Ebola-Associated Waste Management should be placed in double, leak-proof bags, and stored in rigid, leak-proof containers
- The healthcare workers should immediately spray or wipe the outside surfaces of double-bagged waste with an approved MOH disinfectant before removing waste from the room.

Management of the Deceased

- Only personnel trained in handling body of a person who has died from Ebola
- When handling the body of a person who has died from Ebola
 - ✓ *Do not wash or clean the body.*
 - ✓ *Do not perform an autopsy unless it is necessary*
 - ✓ *Do not remove any inserted medical equipment from the body such as intravenous (IV) lines, endotracheal or other tubing, or implanted electronic medical devices*

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HCWs dealing with the body should wear

- Gloves (double gloving is preferable).
- Disposable gown or coverall
- Surgical mask.
- Eye protection (goggles or face shield).
- Waterproof boots or health workers must wear closed shoes covered with shoes cover.
- Body of a suspected or confirmed case of Ebola must be placed in a double body bag.

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- Disposable gown or coverall
- Surgical mask.
- Eye protection (goggles or face shield).
- Waterproof boots or health workers must wear closed shoes covered with shoes cover.
- Body of a suspected or confirmed case of Ebola must be placed in a double body bag.

HCWs dealing with the body should wear

- Place the body in the first body bag.
- wipe over the surface of the first body bag using a hospital-approved disinfectant and seal it..
- Place the body in the second body
- wipe over the surface of the second body
- Label with the indication of highly-infectious material
- Immediately move the body to the mortuary or the cemetery

For more information



GPIC website

<https://gdipc.sa/>

Thank you

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